

## 2.6 Prove Statements about Segments and Angles

Proof—a logical argument that shows a statement is true

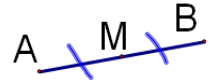
Theorem—a statement that can be proven

Examples of how these are used.  
Give the reason for the conclusions below.

1. Given: M is the midpoint  $\overline{AB}$

Conclusion:  $AM = MB$

Reason: def. of midpt



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2. Given: diagram to the right

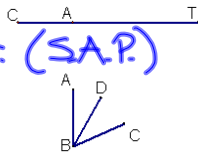
Conclusion:  $CA + AT = CT$

Reason: Segment Add. Post. (S.A.P.)

3. Given: diagram

Conclusion:  $m\angle ABD + m\angle DBC = m\angle ABC$

Reason: Angle + Post. (A.P.)



4. Given:  $\overrightarrow{BD}$  bisects  $\angle ABC$

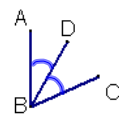
Conclusion:  $m\angle ABD = m\angle DBC$

Reason: def of bisector

5. Given:  $\overline{AB} \cong \overline{CD}$

Conclusion:  $AB = CD$

Reason: def of  $\cong$



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add new one



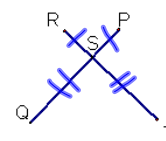
$$\text{Giv: } AB = 3 \quad BC = 4$$

$$\text{Prove: } AC = 7$$

Statements	Reason
① $AB = 3 \quad BC = 4$	① Given
② $AB + BC = 3 + 4$	② Addition
③ $AB + BC = AC$ $3 + 4 = 7$	③ S.A.P
④ $AC = 7$	④ Subst.

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Example 1

Given:  $RS = PS$ ;  $ST = SQ$ Prove:  $RT = PQ$ 

Statements	Reasons
① $RS = PS$ ; $ST = SQ$	① Given
② $RS + ST = PS + SQ$	② Add
③ $RS + ST = RT$ $PS + SQ = PQ$	③ Segment Add Post.
④ $RT = PQ$	④ Subst.

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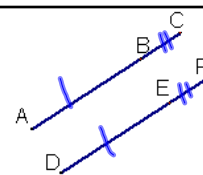
Example 2

Given:  $LM = NO$ Prove:  $\overline{LN} \cong \overline{MO}$ 

Statements	Reasons
① $LM = NO$	① Given
② $MN = MN$	② Reflexive
③ $LM + MN = MN + NO$	③ Addition
④ $LM + MN = LN$ $MN + NO = MO$	④ S.A.P.
⑤ $LN = MO$	⑤ Subst.
⑥ $\overline{LN} \cong \overline{MO}$	⑥ def of $\cong$

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DO:

Given:  $AB = DE$ ;  $BC = EF$ Prove:  $AC = DF$ 

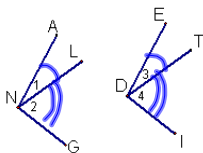
Statements	Reasons
① $AB = DE$ ; $BC = EF$	① Given
② $AB + BC = DE + EF$	② Add
③ $AB + BC = AC$ $DE + EF = DF$	③ S.A.P.
④ $AC = DF$	④ Subst.

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EXAMPLE 3:

Given:  $m\angle 1 = m\angle 3$ ;  $m\angle 2 = m\angle 4$

Prove:  $m\angle ANG = m\angle EDI$



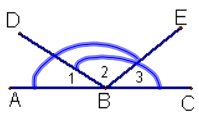
Statements	Reasons
① $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	① Given
② $m\angle 1 + m\angle 2 = m\angle ANG$	② Angle Add. Post.
③ $m\angle 3 + m\angle 4 = m\angle EDI$	③ Angle Add. Post.
④ $m\angle ANG = m\angle EDI$	④ Subst.

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EXAMPLE 4:

Given:  $m\angle ABE = m\angle DBC$

Prove:  $m\angle 1 = m\angle 3$



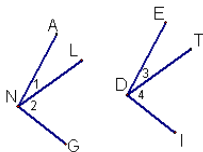
Statements	Reasons
① $m\angle ABE = m\angle 1 + m\angle 2$	① Given
② $m\angle DBC = m\angle 2 + m\angle 3$	② Angle Add. Post.
③ $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	③ Subst.
④ $m\angle 1 = m\angle 3$	④ Reflexive
⑤ $m\angle 1 = m\angle 3$	⑤ Subtr.

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EXAMPLE 5:

Given:  $m\angle ANG = m\angle EDI$ ;  $m\angle 1 = m\angle 3$

Prove:  $m\angle 2 = m\angle 4$



Statements	Reasons
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HW see new homework handout

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